Contents

Preface xiii

Contents xiv

Stochastic models with boundaries and quadratic algebras
F.C. Alcaraz, S. Dasmahapatra and V. Rittenberg 1

Aging and sexual reproduction
R.M.C. de Almeida and C. Moukarzel 10

The spin-glass transition: exponents and dynamics
L.W. Bernardi, N. Lemke, P.O. Mari, I.A. Campbell, A. Alegría and J. Colmenero 21

Learning a spin glass: Determining Hamiltonians from metastable states
S.M. Kuva, O. Kinouchi and N. Caticha 28

Nonlinear transport laws for low density fluids
P. Cordero and D. Risso 36

A generic mechanism for spatiotemporal intermittency
M. Argentina and P. Coullet 45

Conformational structure of amphiphilic copolymers in dilute solution
Yu.A. Kuznetsov, E.G. Timoshenko and K.A. Dawson 61

Pattern formation by electric and electro-osmotic self-organization in biomembranes
M. Léonetti and E. Dubois-Violette 77

Bayesian learning versus optimal learning
M.B. Gordon and A. Buhot 85

A Fermi disks model for the dynamical response of films of liquid ^{3}He
E.S. Hernández 99

Water dynamics in amphiphiles and alcoholic solutions
F. Mallamace, D. Lombardo, B. Fazio, N. Micali, C. Vasi and R. Stancanelli 107

Primordial synthesis machines and the origin of the genetic code
M. Aldana, F. Cázarez-Bush, G. Cocho and G. Martínez-Mekler 119

Reaction rate theory for non-Markovian systems
F.A. Oliveira 128

Contents

Preface xiii

Contents xiv

Stochastic models with boundaries and quadratic algebras
F.C. Alcaraz, S. Dasmahapatra and V. Rittenberg 1

Aging and sexual reproduction
R.M.C. de Almeida and C. Moukarzel 10

The spin-glass transition: exponents and dynamics
L.W. Bernardi, N. Lemke, P.O. Mari, I.A. Campbell, A. Alegría and J. Colmenero 21

Learning a spin glass: Determining Hamiltonians from metastable states
S.M. Kuva, O. Kinouchi and N. Caticha 28

Nonlinear transport laws for low density fluids
P. Cordero and D. Risso 36

A generic mechanism for spatiotemporal intermittency
M. Argentina and P. Coullet 45

Conformational structure of amphiphilic copolymers in dilute solution
Yu.A. Kuznetsov, E.G. Timoshenko and K.A. Dawson 61

Pattern formation by electric and electro-osmotic self-organization in biomembranes
M. Léonetti and E. Dubois-Violette 77

Bayesian learning versus optimal learning
M.B. Gordon and A. Buhot 85

A Fermi disks model for the dynamical response of films of liquid ^{3}He
E.S. Hernández 99

Water dynamics in amphiphiles and alcoholic solutions
F. Mallamace, D. Lombardo, B. Fazio, N. Micali, C. Vasi and R. Stancanelli 107

Primordial synthesis machines and the origin of the genetic code
M. Aldana, F. Cázarez-Bush, G. Cocho and G. Martínez-Mekler 119

Reaction rate theory for non-Markovian systems
F.A. Oliveira 128

DNA evolution and successive file editions
G.F. Zebende, T.J.P. Penna and P.M.C. de Oliveira 136

Crisis on skid row
J.E. Pearson and S. Ponce-Dawson 141

Tsallis entropy and cortical dynamics: the analysis of EEG signals
A. Capurro, L. Diambra, D. Lorenzo, O. Macadar, M.T. Martin, C. Mostaccio, A. Plastino, E. Rofman, M.E. Torres and J. Velluti 149

Geometric features of microtubule dynamics
S. Ponce-Dawson, J.E. Pearson and W.N. Reynolds 156

Computing the scaling exponents in fluid turbulence from first principles: the formal setup
V.S. L'vov and I. Procaccia 165

Landau density functional theory for one-dimensional inhomogeneities
A. Robledo and J. Quintana 197

Domain growth in a multivariable nonpotential system
R. Gallego, M. San Miguel and R. Toral 207

The puzzling statistical physics of liquid water
H.E. Stanley, S.V. Buldyrev, M. Canpolat, M. Meyer, O. Mishima, M.R. Sadr-Lahijany, A. Scala and F.W. Starr 213

Polymer in a strip: profile of the monomer density
J.F. Stilck 233

Thermoreversible gelation of associating polymers
F. Tanaka 245

Percolation in $\pm J$ Ising lattices after removing frustration
E.E. Vogel, S. Contreras, F. Nieto and A.J. Ramírez-Pastor 256

Nonlinear phenomena in soap froth
D. Weaire and S. Hutzler 264

Stochastic resonance in an activator–inhibitor system through adiabatic and quasi-variational approaches
H.S. Wio, M.N. Kuperman, F. Castelpoggi, G. Izús and R. Deza 275

Quantum suppression of chaos in the Fermi accelerator
G. Abal, A. Romanelli, A.C. Sicardi-Schifino, R. Siri and R. Donangelo 289

Exact derivation of the Langevin and master equations for harmonic quantum Brownian motion
E.T. Garcia-Alvarez and F.H. Gaioli 298

Replica mean field theory for granular media
J.J. Arenzon 303

Pattern formation in driven copolymer systems
M. Bahiana 307

Phase diagram for irregular and non-symmetric cross-linked polymer blends
E. Vargas and M.C. Barbosa 312

Mean-field study of the degenerate Blume–Emery–Griffiths model in a random crystal field
N.S. Branco and L. Bachmann 319

Inertial effects on recurrent pattern formation in periodically driven Rayleigh–Bénard convection
O. Osenda, C.B. Briozzo and M.O. Cáceres 325

Exploring collective behaviors with a multi-attractor quartic map
L.G. Brunnet and J.A.C. Gallas 329

Irreversible stochastic dynamics with Potts symmetry
A. Brunstein and T. Tomé 334

Plasma turbulence in tokamaks
I.L. Caldas, M.V.A.P. Heller, R.M. Castro and E.C. Silva 341

Phase coherence in chaotic oscillatory media
L.G. Brunnet and H. Chaté 347

Nontrivial collective behavior in coupled maps on fractal lattices
M.G. Cosenza 357

Short-range Ising spin glasses: a critical exponent study
E. Nogueira Jr., S. Coutinho, F.D. Nobre and E.M.F. Curado 365

Tracer dispersion in double porosity porous media with nonlinear adsorption
G. Drazer, R. Chertcoff, L. Bruno and M. Rosen 371

Autocorrelation functions in 3D fully frustrated systems
G. Franzese, A. Fierro, A. De Candia and A. Coniglio 376

Multi-scaling properties of phase segregation in quenched binary fluids: evidence from simulations
G. Martínez, S. Gonçalves and J.R. Iglesias 380

Inferring statistical complexity in the dripping faucet experiment
W.M. Gonçalves, R.D. Pinto, J.C. Sartorelli, M.J. de Oliveira 385

Long-range interacting solitons: pattern formation and nonextensive thermostatistics
L.E. Guerrero and J.A. González 390

Helping supervised learning with an educated teacher
M.A.P. Idiart and E.L. de Santa Helena 395

Carbon monoxide oxidation over platinum: stable, oscillatory and quasi-chaotic regimes
R.E. Lagos, T. Simões and A.L. Godoy 401

Kosterlitz–Thouless and Manning condensation
Y. Levin 408

Pattern formation in drying water films
N. Samid-Merzel, S.G. Lipson and D.S. Tannhauser 413

Geometrical frustration: a dynamical motor for dry granular media
E. Caglioti, A. Coniglio, H.J. Herrmann, V. Loreto and M. Nicodemi 419

On a generalized Gibbs–Boltzmann ensemble formalism for dissipative systems
J.R. Madureira, Á.R. Vasconcellos and R. Luzzi 424

Damage spreading in the (N_α, N_β) model: exact results
A.M. Mariz, E.S. de Sousa and F.D. Nobre 429

Energy transfer of a chaotic particle in a classical oscillating potential barrier
J.L. Mateos and J.V. José 434

First-difference fluctuations and the complexity of simple population models exhibiting chaos
O. Miramontes and E. Ceccon 439

A phenomenological theory of dynamic processes in granular media
M. Nicodemi 448

Measurement of concentration fields around dendritic growing crystals from solution: characterization of the growth conditions at the dendrite tip
A.G. Notcovich and S.G. Lipson 454

The algorithm of moving boxes to estimate Lyapunov exponents and the singularity spectrum
N.N. Oiwa and N. Fiedler-Ferrara 460

A small review of the Penna model for biological ageing
S. Moss de Oliveira 465

Hierarchical pattern formation
M. Or-Guil, M. Bär and M. Bode 470

Asymptotic moment growth for products of correlated random matrices and applications to disordered conductors
M.J. de Oliveira and A. Petri 477

Temperature relaxation in collisional nonequilibrium plasmas
I.F. Potapenko, A.V. Bobylev, C.A. Azevedo and A.S. Assis 483

Absence of self-organized criticality in a random-neighbor version of the OFC stick-slip model
S.T.R. Pinho, C.P.C. Prado and O. Kinouchi 488

Finite-size scaling on random magnetic structures
F.D.A. Aarão Reis 495

Beyond the Hubbard-I solution with a one-pole self-energy at half-filling within the moment approach
J.J. Rodríguez-Núñez and M. Argollo de Menezes 501

Characterization of localized turbulence in plasma extended systems
R.R. Rosa, A.S. Sharma and J.A. Valdivia 509

Critical behavior of the Ising model on a hierarchical lattice with aperiodic interactions
S.T.R. Pinho, T.A.S. Haddad and S.R. Salinas 515

Kinetic effects in a non-ideal gas of clusters
R. Soto and P. Cordero 521

Statistical thermodynamics of cluster phase transitions
A. Strachan and C.O. Dorso 526

Self similarity in a model of genetic microevolution
D.E. Strier and D.H. Zanette 530

Fluid circulation and solute distribution in a binary fluid mixture: self-organization under osmosedimentation
C. Rodrigues Neto and M.A. Tenan 536

Effects of finite temperature in ballistic quantum dots
M.O. Terra and M.A.M. Aguiar 542

Dynamical model to describe low-frequency fluctuations in semiconductor lasers with optical feedback
G.B. Mindlin, A.A. Duarte, M. Giudici, C. Green, G. Giacomelli, U. Nespolo, L. Giuggioli and J.R. Tredicce 547

Relationship between the structure of the ground level and frustration in $\pm J$ Ising lattices
J.F. Valdés, J. Cartes, E.E. Vogel, S. Kobe and T. Klotz 557

List of contributors 563